

Is Ivy in hedges a problem?

Note from Heather Robertson, with addenda from Neil Downes and Maria Cullen giving an Irish perspective at the end.

Ivy *Hedera helix* sensu lato in hedgerows and on trees

Heather Robertson, 30 Jan 2024

The following text is a summary of a rapid canter through the reference material I have available, it is almost entirely web-based. I have related some personal anecdotes too.

The taxonomy of *Hedera* is uncertain. Some people distinguish *H. hibernica* as a separate taxon to *H. helix* (Strelau et al 2018). However almost all of reference material I found makes no mention of this issue, so treating *H. helix* as encompassing possible *H. hibernica* is the only workable approach. This combined taxon is called ivy for short below.

The peer-reviewed scientific literature seems to concentrate on ivy on trees in woodland, with only a passing reference to hedgerows as one of its habitats. There are some entertaining posts on web sites like Famers Forum asking how to get rid of ivy in hedgerows. Also a hedge-layer web site calling ivy undesirable. There are more hedgerow references in the grey literature. I expect you are much more up-to-date on these sources than me. I refer to some useful older material below. I have included woodland references as they help in getting a general understanding and also useful for me in relation to hedgerow trees. My survey work around Elton includes hedgerow trees, so I have found information about the ivy versus tree controversy which I wanted to cover anyway. I had developed a scoring method for ivy amount on trees but unfortunately I was unable to do much field work last year.

Hedgerows around Elton

There several hedges around Elton where I have made detailed records of woody species and climbers (they are all dull). Bindweed (*Calystegia sepium* probably) only occurred once. It is not obvious in other hedgerows locally either. *Rubus fruticosus* agg is the main scrambling species, filling gaps and advancing from the hedgerows into road verges where unmanaged. Ivy is not frequent in hedgerows locally, and the severely trimmed hedgerows bordering arable and pasture around here have very little. Hedgerow trees on the other hand often have abundant ivy. There is more ivy in hedges west of Elton, possible factors might be more suitable soil or spread from hedgerow trees that have since been removed. Some large stumps occur among the trimmed, thin hedgerows here.

I looked at some North American references on “English Ivy” (see websites below). Ivy is an introduction there and is spreading. There is mention of greater occurrence and spread near settlements. As a new amusement during drives to and from Elton I have seen that there *is* a tendency for ivy to be abundant in hedgerows near houses. There are some patches not close to buildings though. The ivy near gardens may be a mix of cultivated varieties, ivy is a popular garden plant. Some North Americans think *Hedera hibernica* is responsible for spread there rather than *H. helix* (Strelau et al 2018).

It might be a fun project for a student to look at ivy distribution in hedges and which kind of ivy is responsible (potentially only genetic analysis would distinguish them).

Woodland ivy can dominate the herb-layer in its juvenile form (Metcalf 2005). When there is a structure that is climbable (trees, telegraph poles, walls etc) ivy shoots extend up the tree trunk / other structure. Some way up the ivy changes to a mature form (different-shaped leaves) which is capable of flowering and fruiting. It is thought that light levels are involved in triggering the change. (Schnitzler & Heuzé 2006). The adult leaves have a greater photosynthetic capacity than juvenile leaves, which are shade tolerant (Metcalf 2005). However, nobody talks much about how ivy arrived in the first place.

My hypothesis is that hedgerow trees around Elton acquire ivy from pooping birds which have been eating ivy berries. I think the trees are more attractive to birds for shelter than sitting in a heavily managed hedgerow, thus more seeds end up below trees. This means that a slow vegetative spread of ivy from a woodland along the base of a hedgerow until it meets a tree is not necessary. Bird dispersal of seeds would account for the dispersed pattern of no ivy in hedgerows but ivy on hedgerow trees. Unmanaged or lightly managed hedgerows would also be attractive to berry-eating birds. I guess that ivy can spread into other sections of hedgerows from these new ivy nuclei.

Very dense hedgerows resulting from relaxation of management would be unsuitable for most plants. Keith Kirby and I recorded *Mercurialis perennis* in hedgerows near Short Wood (part of Rockingham Forest) a few years ago. At one point Keith crawled into a dense, wide, blackthorn hedgerow and could find few plants of any kind there (see Keith Kirby's Woodland Flowers New Naturalist book, page 261).

I am wondering how much effect past management of hedgerow trees has had. Hedge-layers probably pulled ivy out and foresters kept timber trees clear, as ivy could have been a nuisance in both situations.

Climate change and eutrophication

Modelling of the response of woodland ivy to climate change has produced unclear results. A rise in temperature may reduce habitat suitable for ivy and move its distribution north and east. However, temperature might interact with increased carbon dioxide fertilisation which could favour ivy and allow it to spread within its current range (Manzanedo et al 2018). We should not describe ivy as a mild Atlantic or oceanic species, as some references do, given its range east to countries into Ukraine and round much of the Mediterranean Sea (Metcalf 2005). One of the references I have included is about ivy in Sicily (Garfi & Ficarrota 2003).

Experimental increase of CO₂ around trees in a Swiss forest found large shoot extension in understorey ivy. This would increase the chance of contact with a tree trunk, and thus ivy could reach more trees (Zotz 2006). In Rhine forests ivy was found to positively respond to increasing temperatures in February and March (Heuzé et al 2009).

Eutrophication from increasing nitrogen input from the atmosphere and adjacent agricultural drift may also be playing a role in woodlands. Nitrogen-demanding herb layer species, including ivy, have increased in a forest in France (Thimonier et al 1992). Modelling of climate and atmospheric nitrogen deposition suggested that ivy would be affected in these scenarios (Rizzetto et al 2016). Some people are wondering browsing by deer is also having an effect on woodland flora, including ivy (Heinrichs et al).

In Britain, a set of plots in woods were recorded in 1971 and then compared with a repeat survey in the period 2000-2003. Ivy was recorded on the tree and shrub card as presence / absence but included as a ground flora species in the analysis. No climber category was analysed separately. In the whole species list of herbs, only 8

species had greater numbers of plots where they were present in 1971 than ivy. Since that time all had decreased, including ivy. *Rubus fruticosus* agg. was the top species with 1247 plots in 1971, and 1076 in 2000-2003. Ivy had 595 plots in 1971 and 509 in 2000-2003. Some evidence of nitrogen deposition or enrichment was reflected in species changes (Kirby et al 2005).

One study of permanent plots in forest across European countries found an increase in frequency of ivy, though survey of plots (oldest 1933) and resurveys differed widely in time, most recently in 2015 (Perring et al 2020). Another of this type of survey also found ivy abundance had increased, over about 50 years. Most recent recording was 2009, again with a background of variable times of plot recording (Heinrichs et al 2012).

A hedge bank re-survey in Dorset (Dorset Environmental Records Centre 2003) showed ivy had increased and also climbers like bindweed (*Calystegia sepium*) had increased. The published Countryside Survey 2007 results are too general to cover individual species. The UK hedgerow herbaceous flora project (Critchley et al 2010) characterises vegetation types in which ivy features as a community component. There could be more species specific information in the vegetation surveys mentioned in such reports, eg local hedgerow surveys, and plot level data in more recent Countryside Surveys. Analyses of the older Countryside Surveys in 1978 and 1990 (Cummins et al 1992) showed that *Hedera* was increasing. It has the greatest change of the herb species listed as increasing, though mean difference seems quite small, it was 10% from 1978 to 1990. This could suggest a yearly increase of not far short of 1%, which sounds faster!

Controversy about effect of ivy on trees

The possible damaging effects of ivy on trees worries people around my village as many of them are keen on trees. They do not want to lose trees because of ivy and are convinced ivy is spreading.

The traditional British conservation response is that ivy does not damage trees, see the Woodland Trust web site. It might dominate the canopy among trees already 'going back' but in general it is not a problem. The North Americans on the other hand are sure that this invasive species is killing trees (<https://extension.oregonstate.edu/catalog/pub/ec-1595-invasive-weeds-forestland-english-ivy>, and <https://www.fs.usda.gov/database/feis/plants/vine/hedhel/all.html>). It all depends on where you live!

Neither side have produced any evidence relating to tree mortality. I have looked at a review reference about liana ecology more generally to see if anything useful emerged (Schnitzer & Bongers 2002). Tropical lianas have been studied more than temperate ones. There is evidence for abundant lianas increasing tree-fall in winds and reducing host tree growth. A study in cool-temperate forest in Japan found that climber species that reached high into the canopy, and were capable of spreading to other trees there did reduce tree growth compared to trees without lianas, demonstrated by tree ring analysis (Ichihashi & Tateno 2011).

There has been some European research on ivy in woods, particularly in the Rhine valley. Overall, trees with ivy were more likely to fall than those without, although size class analysis had insufficient samples of large trees, which have more ivy than younger trees, to show if they were more or less susceptible to large trees without ivy (Schnitzler & Heuzé 2006).

A small study of ivy and *Quercus pubescens* in Sicily found some increase in tree growth at the early stages of ivy growth but later tree growth was reduced compared to trees with no ivy. A favourable effect of ivy litter on mineral cycling was suggested to explain better growth of ivy-clad trees in early years (Garfi & Ficarrota 2003).

An evidence-free opinion is that only a tree in poor condition prior to ivy colonization will not be able to cope with ivy, which would benefit from reduced tree crown density and greater light levels. Ivy seems to grow up

any kind of tree around Elton, healthy or not. Ivy is shade tolerant when growing on the forest floor and when first climbing a tree trunk from the ground. Juvenile ivy can also grow up shaded trees in the understorey. The peak density of ivy was greatest in the sub-canopy in one area of the Rhine valley (Schnitzler & Heuzé 2006).

An anecdote from Elton is that ivy grows up into conifers including *Taxus baccata* and *Thuja plicata*. I am not sure if loss of ash trees due to ash dieback will make much difference to the spread of ivy. It might depend on the abundance and density of other trees and shrubs. Around Elton the growth of ivy which ends up dominating the tree canopy can be very fast, it is not creeping up only moribund trees. The pictures below show a left-leaning *Crataegus monogyna*, partly behind *Fagus sylvatica* branches. The *Crataegus* has been swamped very quickly:

13th March 2017 Tree line west side of Nassington road



6th March 2021 (wider camera lens)



Several European studies point to large trees having giant ivy trunks and canopies (Wyka et al 2023, Castagneri et al 2013, Schnitzler 1995). The link might be something to do with tree age, because the ivy may have been growing on the tree for a long time. But big trees might shelter more pooping birds and the seed “rain” would be larger and the chances of successful germination of one or more seeds would be higher than around small trees. It is very difficult to ascribe ivy observations to causes, as is the case in much ecological research.

Overall, I do not think we can keep on saying that ivy does not damage trees. We might have to accept some damage to conserve other biodiversity but we should admit that.

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Addendum A from Neil Downes

The Hedgerow Appraisal System records the presence / absence of ivy in a hedge and a DAFOR recording for its presence at canopy level. Where 25% or more of the canopy is dominated by ivy this is recorded as a negative indicator. I have not collated all of the data from the various County hedgerow surveys produced under this methodology (from 2010 onwards) in order to do an analysis.

I am of the view that ivy can be problematic in hedgerows. Ivy is a woodland plant and it gets much greater levels of light in a hedgerow than it would normally get in a woodland setting. It grows very vigorously as a result. When growing well it can tend to out compete its host, particularly where that host is in sub-optimal condition. In such circumstances it may not be the cause of the decline of an individual tree but it can hasten the decline.

Once at canopy level ivy is directly competing with the tree for access to light. A tree that cannot feed itself well enough is unlikely to thrive in the long term.

I concur with the views of others who I have contacted in that part of the problem is the reduced browsing pressure that results from changed farming practices;

- Fencing off hedges reduces livestock browsing - ivy is rarely dominant if sheep have access to the hedge
- Lack of utilisation of ivy as a food source by farmers - it used to be fed to stock over the winter when there was an absence of other green food around.

I was working on a hedge a few years ago in February; tall, with a lot of ivy in the canopy. There were three bullocks in the adjacent field. When we were thinning the top of the hedge to free up the stems for laying they cautiously came over to investigate and once they did they got stuck in to the ivy that had been cut from the hedge. On the second day when they saw us arrive at the hedge they came over expecting their breakfast. Same on subsequent days. They didn't eat it all but they clearly were happy to get it.

From my hedge laying experience I have also seen the constriction effects of ivy. Where ivy totally encircles a stem or branch it basically acts as a form of strangulation on the flow of sap. I used to have a really good example of this taken from a hedge I was working on - below the point of encirclement the wood was sound; above it, the wood was dead - I took it around to agricultural shows along with other practical examples to illustrate various issue (impact of nailing or stapling, etc). One day somebody thought that my bag of educational resources was firewood and made off with it!

I have found that in hedges that have reverted to treelines where ivy growth is strong the only nests in the hedge are in the dense cover of the ivy.

Attached are some thoughts from Maria Cullen, of the plant pathology group.

Balance in natural systems is critical to sustainability. Hedgerows are part of essentially artificial or semi-natural systems. My impression is that there is an increasing tendency for ivy to become dominant and we are losing balance.

This above is more from observation and intuition than being scientific but there is a role for intuition.

Neil

Addendum B from Maria Cullen

There is a small, published booklet by the late Dr. Risteard Mulcahy called "For the love of trees". This small publication detailed the damaging effects, as well as the harm to the positive aesthetics of hedgerows and trees that are smothered in Ivy.

From the perspective of tree health, Ivy can act as a net into which a larger number of spores from pathogenic fungi can land and take hold.

Caring about epiphytic lichen and bryophyte biodiversity and biomass, Ivy is a great threat to species-level and habitat integrity levels of biodiversity. This takeover by shading, smothering and mycorrhizal means has led to a huge loss of lichen, moss and liverwort communities on trunks and boughs of most tree types. Eradication of ivy from standard hedgerow, parkland and woodland trees is essential. The other major threats are regional and local air/water pollution and felling/flaying/serious damage by humans.

During the 1940s and 1950s at least in Ireland, Ivy was widely gathered, particularly as Winter (hungry months) fodder for domestic animals.

Conflicting messages about Ivy management in Parkland, Avenue, Hedgerow and Broadleaved Woodland settings has led some owners and managers to stop Ivy control that had been a part of woodland and tree management in Ireland. When people do not know what to do, they tend not to make a choice and doing nothing has left many areas open to a huge surge in Ivy becoming a native invasive species.

From our 30 years of surveys in Irish woods and from our EpiAir work, there are strong indications that Ivy is favoured in areas of intensive agriculture where eutrophication of air and waters is taking place. In the West of Ireland, there is a linked loss of habitat for sensitive cyanobacterial/fungal lichen associations as well as for crustose species diversity. In the east of Ireland, where annual rainfall is about half of the western maxima, old growth species diversity and the few areas where cyanobacterial/fungal lichen had survived are under intense stress from Ivy.

One habitat that Ivy finds challenging is wet woodland as Ivy does not like to get too wet. Willow, wet woodland and riparian zones are now the critical habitats for lichen species diversity. Even so Ivy encroachment can start from the canopy downwards when birds drop seeds into crooks of large trees.

We have many photos to demonstrate that Ivy has a combined weakening effect on parkland, hedgerow and woodland edge trees. In Winter, Ivy increases the "sail area" of trees that are otherwise devoid of leaves. Ivy can climb up one side of a tree and so the tree may over time be held from swaying naturally. As time goes on this bias can lead to pinning and leaning of trees so in conditions of soft soil and high winds trees can be pulled down.

Unfortunately, the level of ignorance is becoming so great that many people think the mass of Ivy in the crowns of trees are the leaves of the trees themselves. When the impact of Ash Dieback (*Hymenoscyphus fraxineus*) is explained to people in the field, some express surprise that they thought the Ivy leaves were the trees own leaves. They did not realise the trees themselves were dead or dying.

Ivied trees can look less attractive than stately trees so that over time their removal is less heart-rending to a community. This seems like a minor point but in combination with a view that ivied trees may be more dangerous, by roads for example, this can lead to these trees being flailed or felled as dangerous, unloved or worthless.

When Ivy climbs toward the crowns of trees the number of leaves the tree can produce declines. This places the tree at an advantage from late or early frosts, from pathogens (of which there are more and in greater amounts) that can take hold in a tree already under pressure. This has been a significant issue I think for Ash. Undermining Ash by Ivy has been significant in this way. Ash is in leaf for a short time each year as it is so reduction in leaf number may leave Ash more susceptible than other tree species to diseases and pests.

While Ivy is helpful to some species of insects for example, the losses of lichen, moss and liverwort cover also leads to a decline in associated snails, tree slugs, insects, birds, moths, spiders etc. that live among, feed on, make nesting material and shelter in these species.

If it helps, a long list of lichen, moss and liverwort species that are under threat from Ivy shading, drying, encroachment and smothering can be shared for Hedgerow Standards, Parkland and Woodland settings depending on the host tree types in each setting.

Maria Cullen 15/2/2024